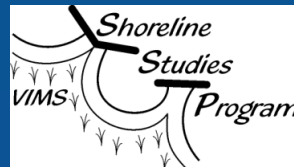


A Guide to Shoreline Management Planning For Virginia's Coastal Localities

Shoreline Studies Program
Virginia Institute of Marine Science



Introduction

- Erosion control in Virginia's coastal regions has been inconsistent.
- Improving knowledge and shoreline planning are key to mitigating shore erosion.
- Landowners look for guidance on management strategies, and a critical need exists to inform landowners on their options.
- Erosion threatens private and public property alike.
- Investment in a Shoreline Management Plan will yield substantial benefits for localities.



A living shoreline provides the natural Connection between the upland and water.

What is a Shoreline Management Plan?

- Is a tool for evaluating, planning, and implementing appropriate management strategies
- Creates a knowledge base of data necessary for decision-making.
- Develops site-specific management strategies for specific counties or watersheds.
- Provides an optimal, balanced approach for shore stabilization.
- Emphasizes the use of marshes, beaches, and dunes for shore protection where appropriate, also known as Living Shorelines.



A bulkhead provides shore protection for houses, but it does not provide the land-water connection that is healthy for the Bay.

Living Shorelines

Vegetated riparian and marsh buffers along the shoreline provide a natural land-water connection rather than creating a barrier such as the bulkhead does.



Why do Localities need a Plan?

- It is a means for regulators and landowners to make informed shoreline management decisions.
- Everyone in the county wins when water quality is enhanced, and the health of coastal waters is improved.
- A Shoreline Management Plan (SMP) is an effective component of a locality's comprehensive plan.
- The plans, based on science and field visits, can serve as an example of best available technical advice when dealing with permitting agencies.



In the absence of guidance, homeowners may use a variety of techniques that are both visually unappealing and often unsuccessful at long-term erosion control.

Permitting Tangle

All these agencies have a role in allowing the construction of shore stabilization structures. By having a SMP, the scientific information necessary for permitting is available and many of these agencies consider the Shoreline Studies Program's recommendations best available technical advice.

- Dept. of Conservation & Recreation
- Local Wetlands Board
- Virginia Marine Resources Commission
- Dept. of Environmental Quality
- U.S. Army Corps of Engineers
- Plus various advisory agencies including VIMS, U.S. Fish and Wildlife, etc.



Other SMP Considerations

- Addresses shore zone issues on a comprehensive basis
- Provides coastal hazard planning including flooding, storm surge, and sea-level rise
- Can include:
 - Sand management and dredging of shallow draft channels
 - Wetlands mitigation/compensation
 - Living shorelines initiative/habitat
 - Bay Act requirements/water quality
 - Nearshore zone habitat use conflicts

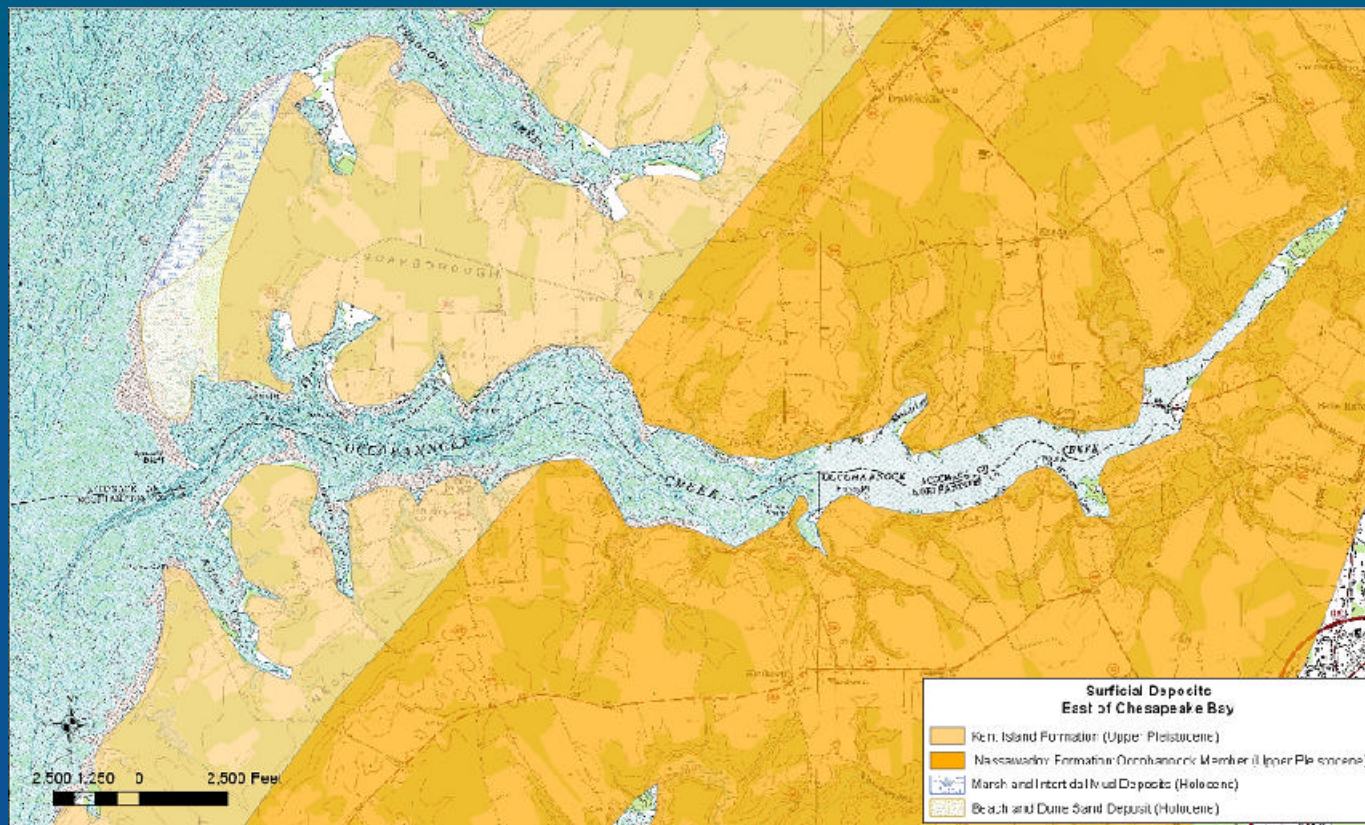


Elements in the Shoreline Studies Program's SMP

- Describe underlying geology and morphology
- Quantify historic and recent shoreline change with maps showing digitized shorelines of the past and present
- Map existing structures and current bank and shore condition
- Assess existing marine resources within the shorezone
- Analyze the general wave climate, storm surge and long-term sea level rise in order to assess the level of protection required and associated costs
- Development of site-specific shore management strategies

Geology and Morphology

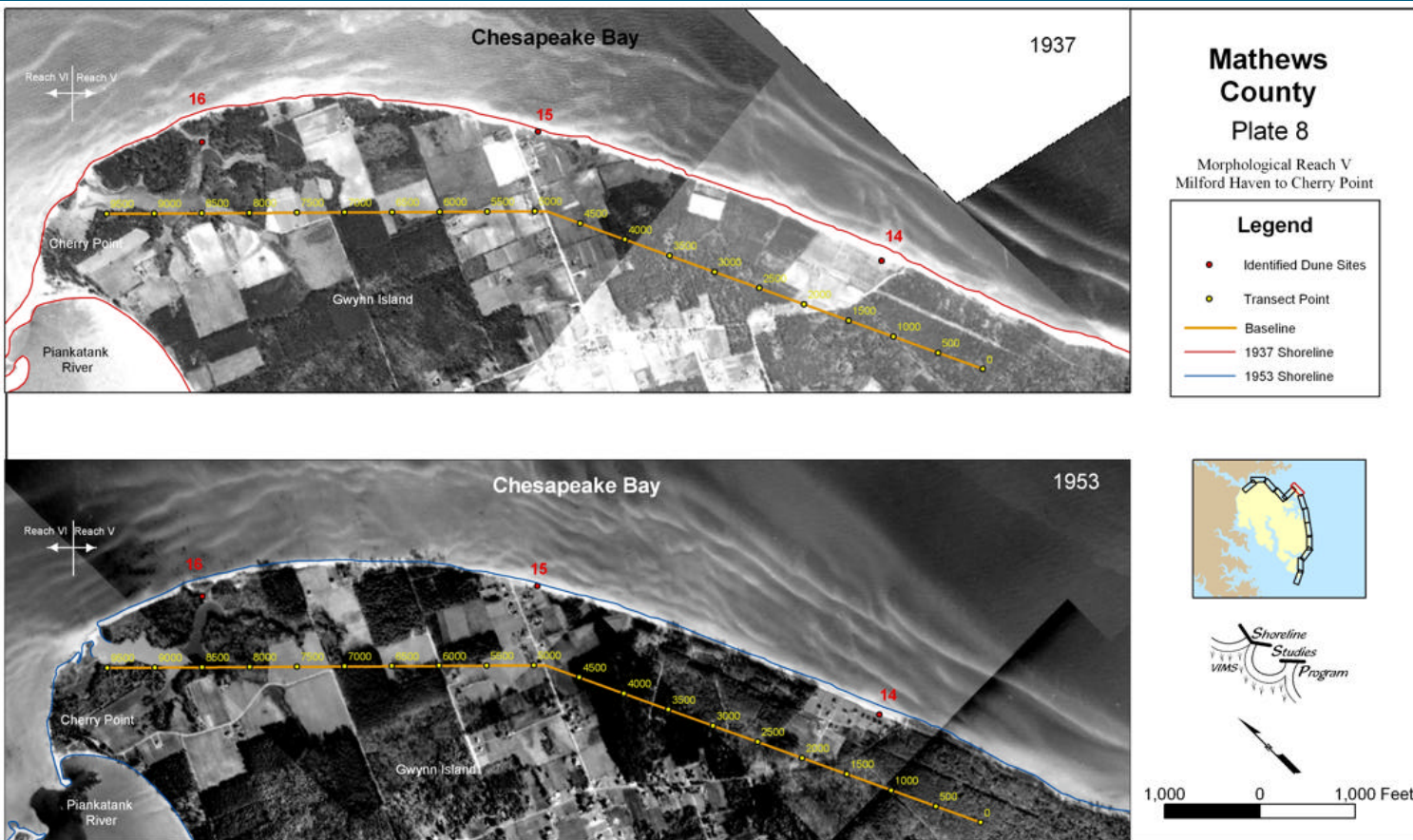
Understanding the geology and morphology (shape) of the shore will determine what type of sediment is available and how the shore responds through time to the forces acting on it.



At Occohannock Creek on the Eastern Shore, the geology changes mid way up the creek from a low bank (yellow) to a high bank (orange). Bank height is a parameter in determining what strategies can be used for shore protection.

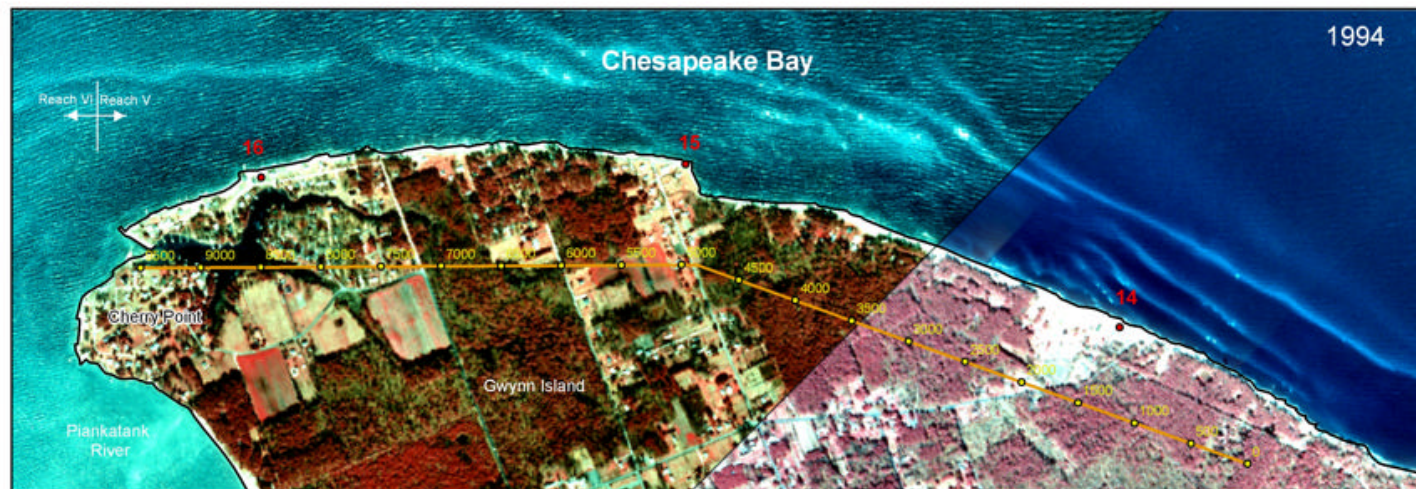
Shoreline Change

Quantifying the rate of shoreline change shows how the processes vary not only in different areas but also through time.



Using Geographic Information System (GIS) software, historical and more recent photos can show the development as well as changes in landuse and shoreline features through time.

Shoreline Change

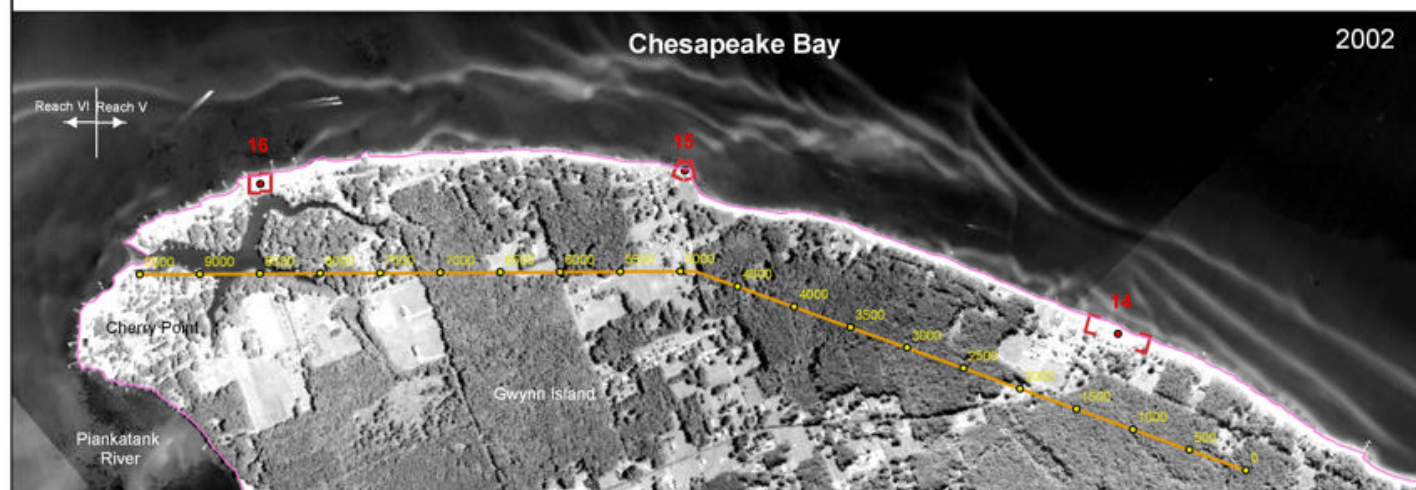


Mathews County Plate 8

Morphological Reach V
Milford Haven to Cherry Point

Legend

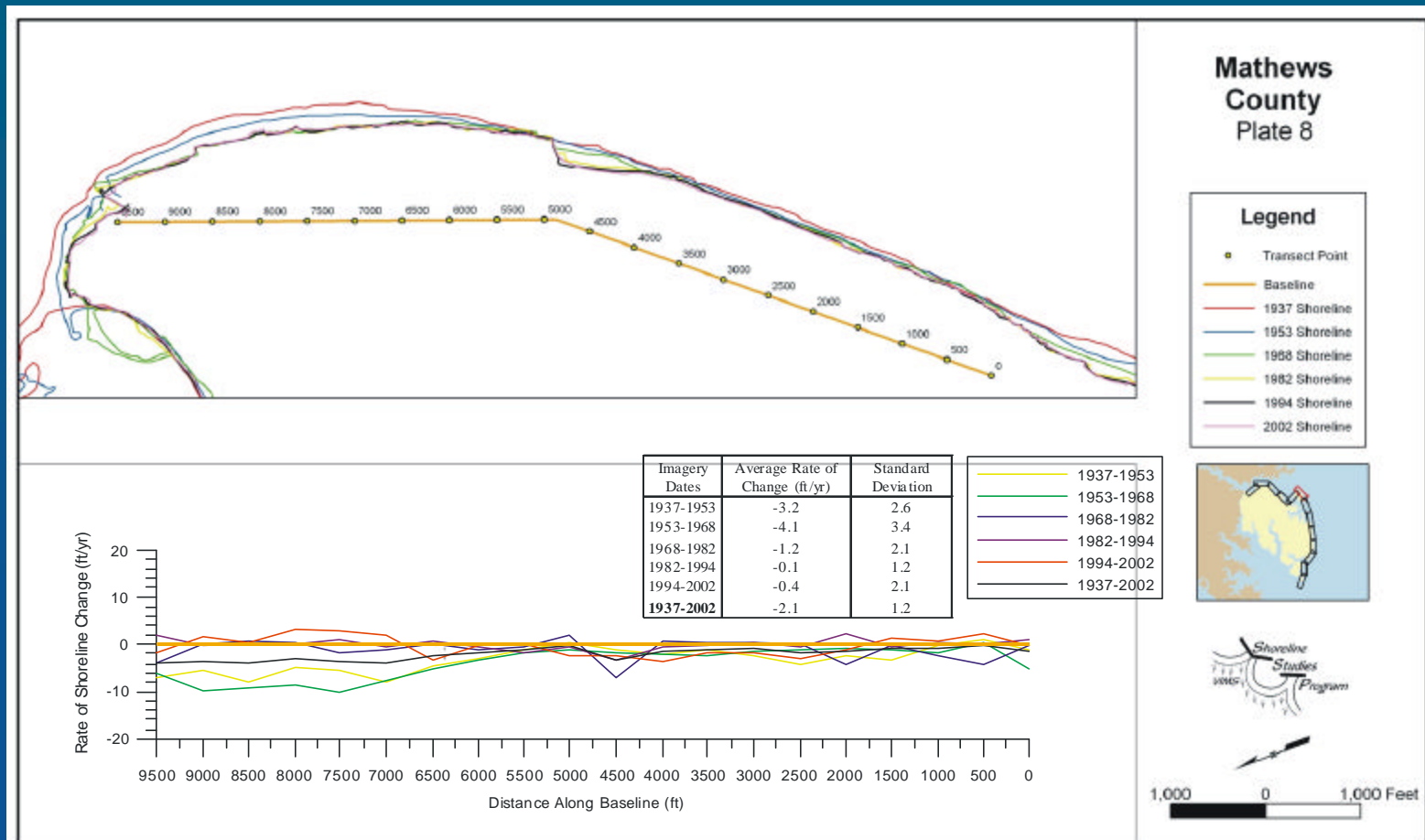
- Identified Dune Sites
- Dune Site Limits
- Transect Point
- Baseline
- 1994 Shoreline
- 2002 Shoreline



1,000 0 1,000 Feet

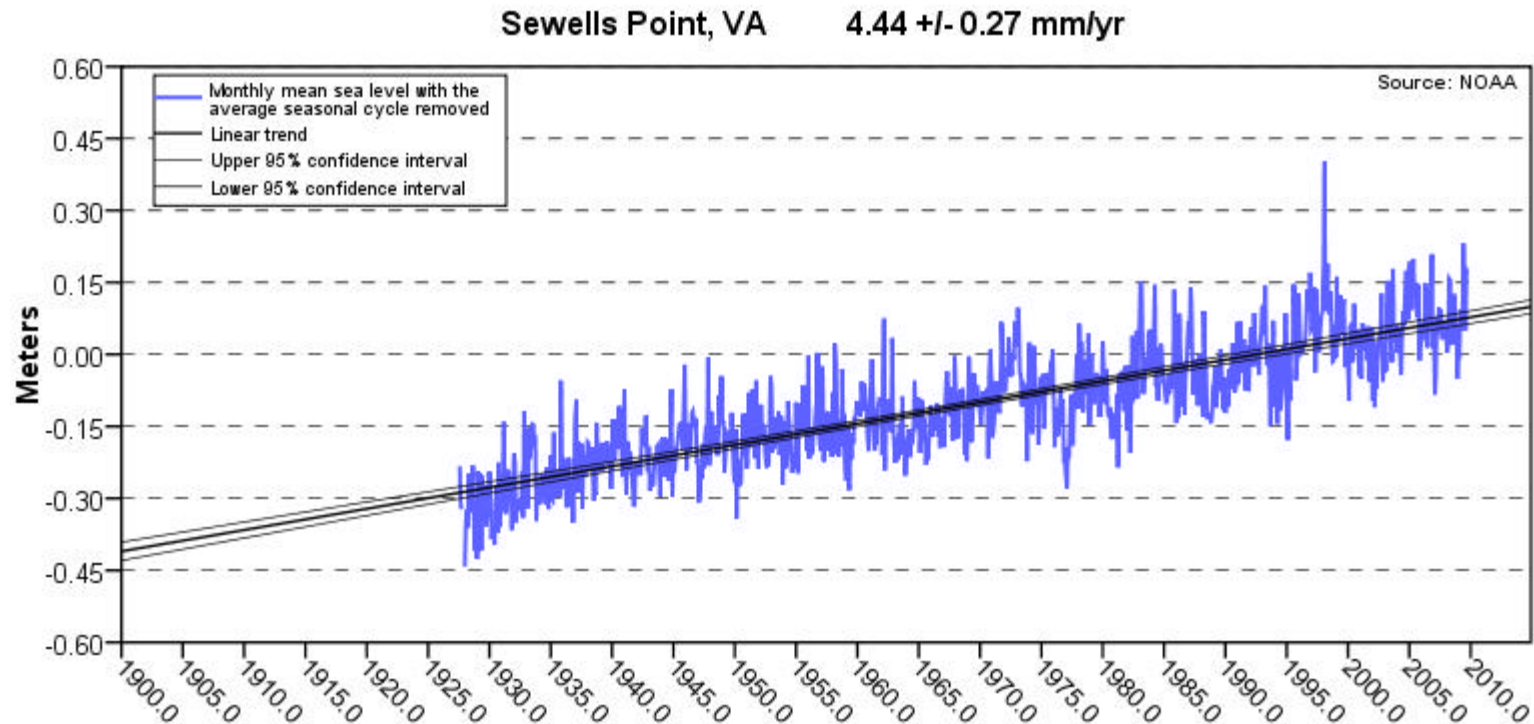
Shoreline Change

Shoreline retreat can vary greatly depending on the geology and morphology of the shoreline as well as any impacts from man's activities.



Sea Level Rise

Sea Level is rising in Lower Chesapeake Bay at a rate of 17 inches per century. The change in sea level over the life of proposed structures relates to the level of protection that a property owners wishes to provide for their shore now and in the future.



Existing Conditions

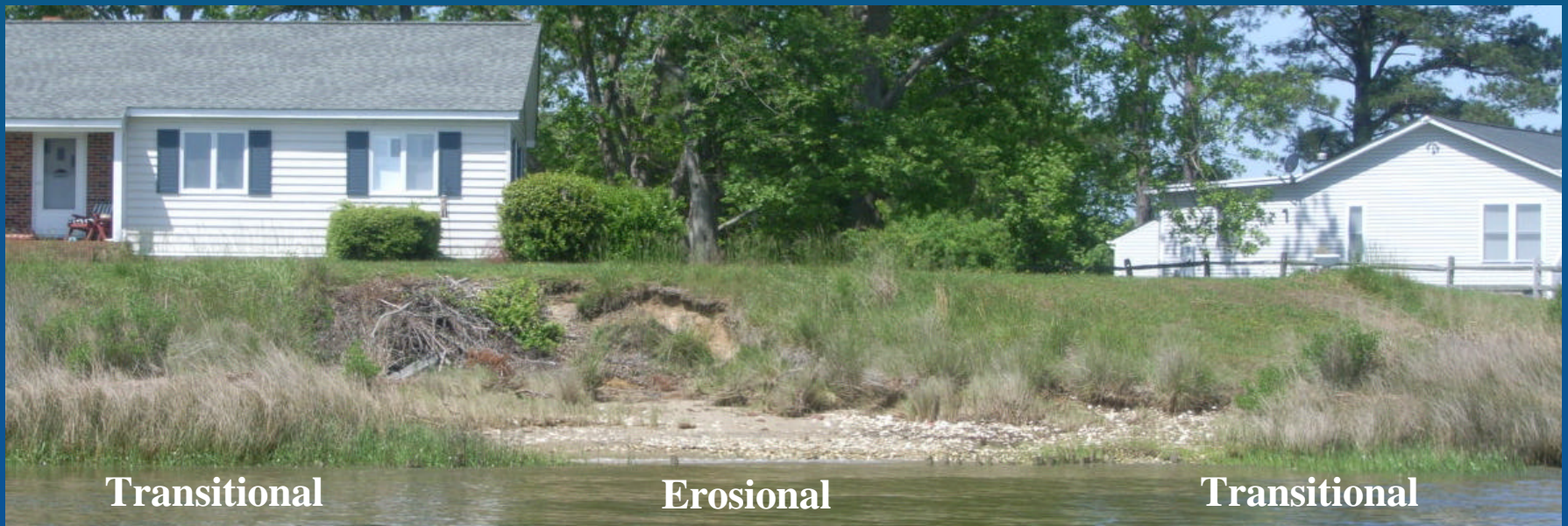


Stable
Shore





Transitional
Shore



Transitional

Erosional

Transitional



Erosional
Shore



What Shore Stabilization Strategies are Used?

- Strategies that effectively stabilize the shore and that maintain habitats, also known as Living Shorelines.
- On lower-energy shores, the maintenance or creation of marshes through planting grasses and sills.
- For higher energy, open coasts, breakwaters and beach sand.



A breakwater system is effective shore stabilization on higher energy shorelines. The system can create a living shoreline with beach fill and dunes.

Site-Specific Recommendations

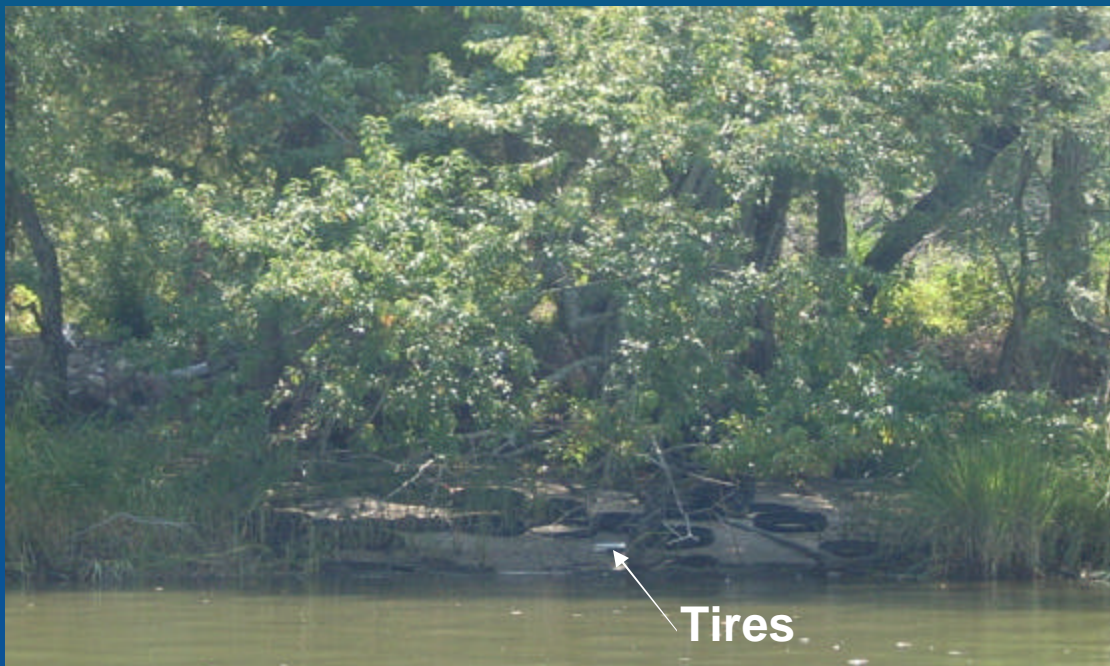
- Do Nothing
- Marsh Management (Trim trees and/or plant existing bottom with marsh plants)
- Sills
- Breakwaters

An eroding shoreline was enhanced with a small low sill.





Overhanging trees and limbs can provide too much shade for the marsh to grow. When the marsh fringe dies, the bank will be exposed.



At this point, homeowners tend to place things on the shoreline to reduce perceived erosion. However, limbing trees and possibly replanting with marsh grass will reestablish the marsh.

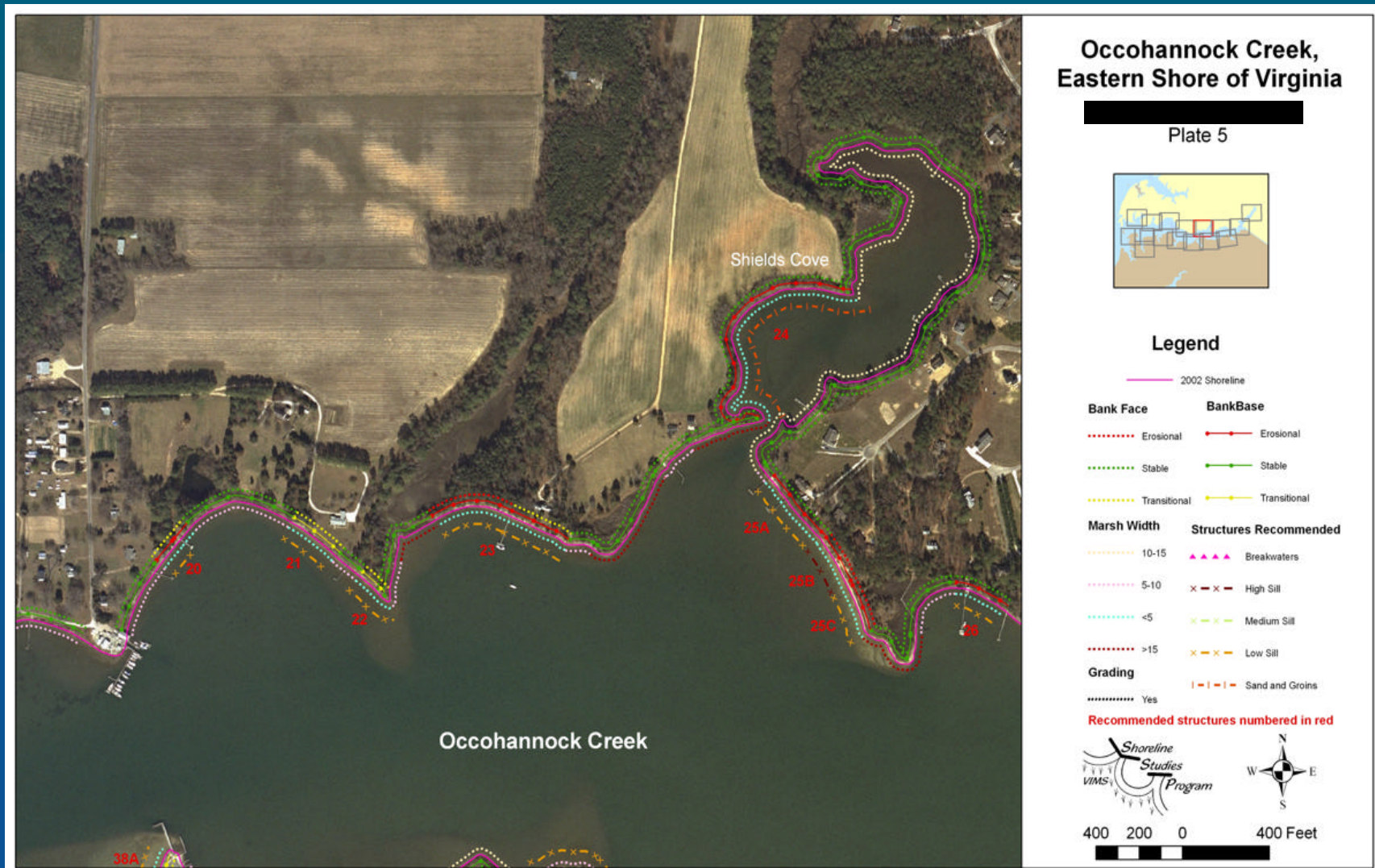


A stone sill provides long-term protection for the marsh fringe, stabilizes the system, and interfaces with the upland riparian wooded buffer.



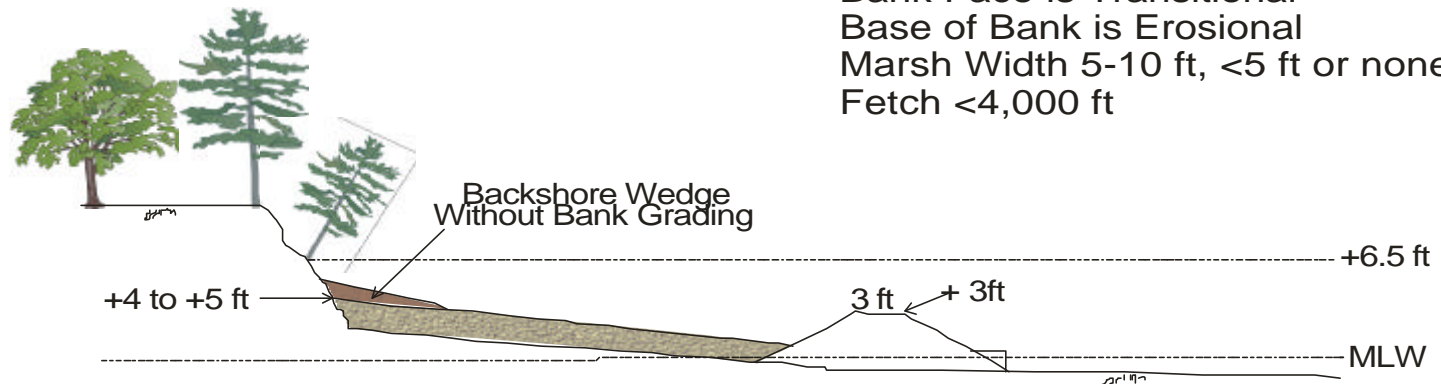
Breakwaters with beach sand fill are appropriate for longer stretches of shoreline with higher energy impacting them.

Each section of shore is visited, and site specific conditions are noted. These data are summarized and plotted with each recommendation.

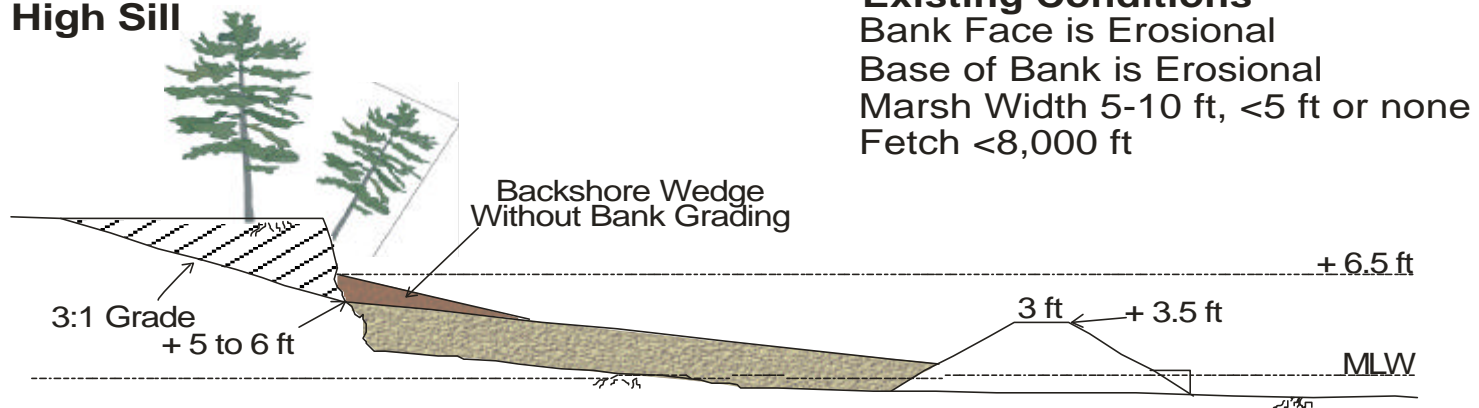


For each recommendation, a typical cross-section is developed that can be used by homeowners to develop an approximate cost.

Medium Sill



High Sill



Funding Plan Development

- Depends on the amount of shoreline
- Funded by state and federal grants
- Efficient, cost effective tool for the locality and its citizens



Headland control is a method of placing breakwaters far apart and allowing the shore between them to erode to stable embayment.

Shoreline Studies Program at VIMS

- The Shoreline Studies Program in the Department of Physical Sciences at the Virginia Institute of Marine Science has been developing Shoreline Management Plans for Virginia's Federal, State, Local governments, military bases, and private lands for over 20 years.
- These plans have resulted in the construction of millions of dollars worth of shore zone systems that not only stabilize the shore and protect upland infrastructure but also provide very real environmental components.
- These systems create an environmental edge along that shore that can include marsh, beach, and dune creation while reducing the input of sediment to Chesapeake Bay and creating buffers for water quality.

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For more information

Shoreline Studies Program:

<http://web.vims.edu/physical/research/shoreline/?svr=www>

The Bay Act:

http://www.dcr.virginia.gov/chesapeake_bay_local_assistance/index.shtml

Living Shorelines:

<http://ccrm.vims.edu/livingshorelines/index.html>

Occohannock Creek Erosion Assessment and Living Shoreline Option Report:

<http://web.vims.edu/physical/research/shoreline/docs/OccohannockCreek/OccohannockCreek.pdf>